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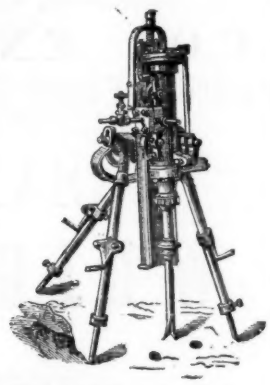

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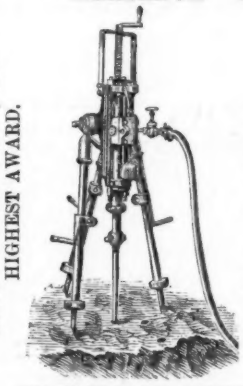

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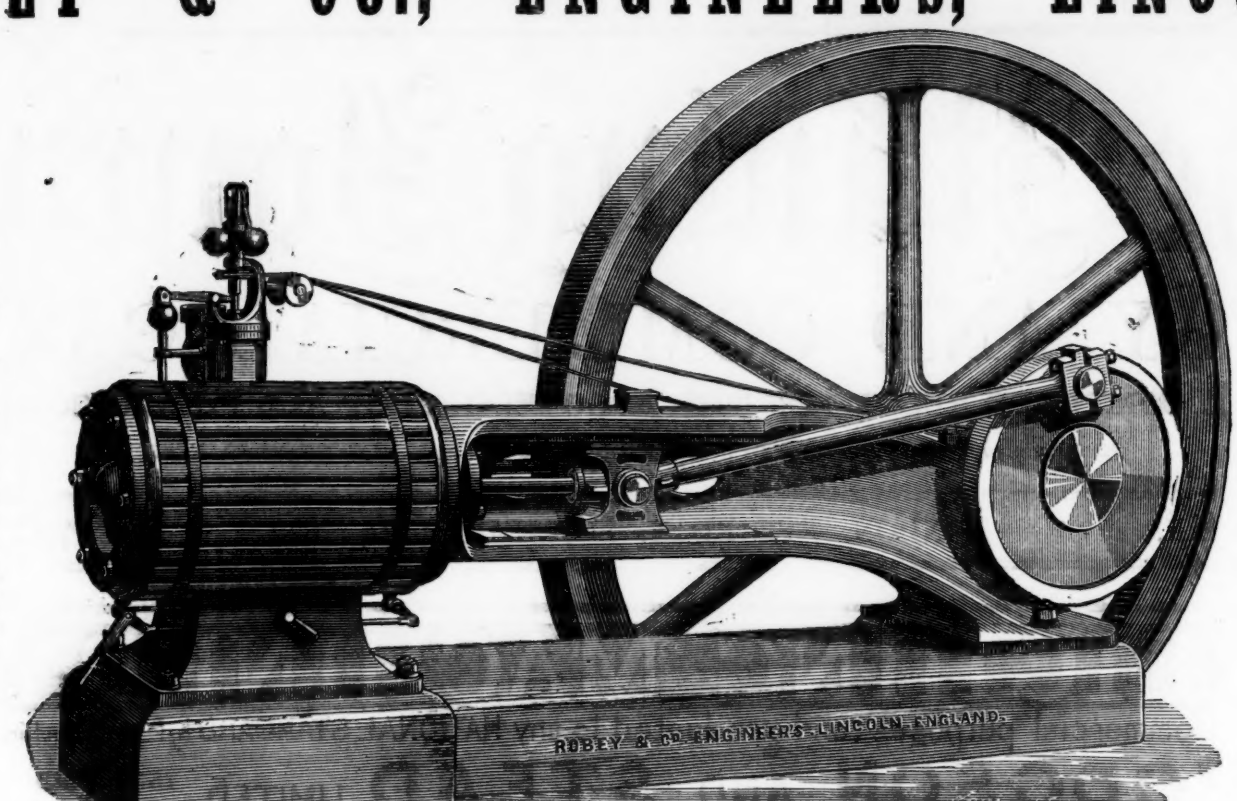

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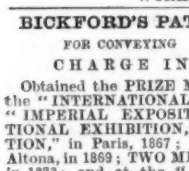

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WASHING FURNACE SMOKE.

SIR,—Referring to an article on the above subject in the Journal of Sept. 6, I wish to remark that the escape of acid compounds contained in furnace fumes is not taken into account in reference to Messrs. Johnson and Hobbs' condenser, and this part of the question is of the most vital importance, because of the injurious effects of noxious gases which no smoke-burning plan up to the present has been able to arrest or destroy, and the condensation of those gases is the very thing claimed for Messrs. Johnson and Hobbs' invention. So far I can confidently say the object of the said invention has been attained, both in a commercial and sanitary point of view, and it is hardly fair to attribute the faults of the stoker to the condenser in regard to the quantity of carbonaceous matter arrested in it. To my mind it rather bears out the utility of the condenser.

Linares, Spain, Sept. 18. —— PRACTICE.

DETECTION OF FIRE-DAMP IN MINES.

SIR,—It is not a little curious that whilst apparatus for indicating the existence of fire-damp has received comparatively little attention for some time past, there are just now two new propositions for effecting that object, and what is still more remarable both involve the use of platinum or a salt of platinum. The first, by Mr. Fred. Higgins, of Cornhill, is worth only a passing notice. He proposes to employ platinum or some other metal possessing the property of becoming red hot under the influence of hydrogen or hydrocarbon gas when heated. He maintains the platinum or other metal in a heated state by means of a current of electricity, and so arranged that the additional heating caused by the contact with combustible gases causes a signal to be made, either by opening or closing an electrical circuit, or in other ways in which signals are produced by electricity at a distance, or a mechanical arrangement may be actuated directly for producing an alarm on the spot. It may be mentioned for the information of those not well acquainted with chemical nomenclature that by hydrocarbon gas Mr. Higgins evidently means the same gas as that usually designated carburretted hydrogen.

The other invention is more important, being what the Germans call a "Studiosusrerummontanarumer Erfindung," and involving the application of a mechanically automatic indicating apparatus in combination with the inventor's own discovery of a peculiar property of platinum black. The invention of Mr. Guido Körner, "Studiosusrerummontanarum of the City of Freiberg," Saxony, is based upon the discovery that platinum black causes light carburetted hydrogen (CH_4), which is the chief constituent of fire-damp, to condense on its surface even when but a small amount of this gas is present in the atmospheric air, and in this close contact to cause a combustion of the light carburetted hydrogen. He provides a box partly made of open wirework, and places within the same a thermometer tube filled with mercury and open at the top, into the bulb of which thermometer a piece of platinum wire has been inserted while the glass was in a liquid state, the said wire being connected to a conducting wire by means of a set screw. The glass bulb of the thermometer is surrounded by a carbon cell which is filled with platinum black. When economy is an object he can employ a mixture of platinum black and asbestos instead of pure platinum black. Two platinum wires of different lengths dip down into the top part of the said glass tube; the longer of these leads direct to an electric conducting wire, but the shorter one leads first through an electric bell apparatus placed near to an indicator and then to the conducting wire. Several of these indicators are placed in the mine.

If fire-damp is present it will pass through the wire netting of the box, penetrate with a mixture of air through the said carbon cell, and lastly make its way to the platinum black. The latter effects a slow combustion of the same, and the mercury rising in the glass tube through the action of the heat thus devolved touches first the aforesaid longer platinum wire. Thus a conducting connection is established between the point of platinum in the bulb and the point of the longer of the two platinum wires in the top of the tube, and it is thus made possible to signal the fire-damp to the top of the mine by means of an electric current, If now by the development of heat, which depends upon the quantity of carburetted hydrogen mixed with the air, the mercury should rise to such a height that it touches the second platinum wire—the shorter one—then the current will operate a pit alarum, which is connected with this wire close by the indicator. The first requirement appears to be that persons in the office connected with the mine should be made aware of the presence of the fire-damp, in order that suitable precautions may be taken for the prevention of accidents, He, therefore, places a signalling apparatus in the said office for this purpose, and an electric signal receiving or collecting apparatus in the mine, which receiving apparatus is made on the principle of the so-called Siemens needle apparatus. The needle on the said receiving or collecting apparatus in the mine guides a small wheel in a circular path on which are arranged conductors insulated from each other. Each of these conductors on the circular path is connected with the conducting wire of each indicator.

The current is thus conducted. From the negative pole of the battery to an electro-magnet in the said signalling apparatus, whence it passes to and through the said receiving or collecting apparatus to the return wire and to the positive pole of the battery. This is when only one receiving or collecting apparatus is used in the mine, but if several receiving apparatuses are used, then the current will be led through all of them in the same manner before it reaches the return wire which conveys it to the positive pole of the battery. The electro-magnet in each apparatus will attract a movable piece or anchor at the same time. By this means a bridge piece provided in each apparatus will be pressed upon a contact sorew, the current will be broken, and a ratchet wheel will be turned one tooth further by means of a sgring. By the contact between the said bridge piece and the said screw, and while the said ratchet wheel is advanced one tooth, the current will be led through various parts of the apparatus to the needle of the receiver or collecting apparatus, the said small wheel, and to the indicator. If the current is closed in this indicator through the mercury then it passes on through indicator No. 3 to the return wire and to the positive pole of the battery. The electro-magnet in this circuit will consequently attract its anchor, the alarum is sounded, and the needle indicates in the office by which indicator the current has been closed—that is to say, at what part the fire-damp is present.

By the return movement of a lever in the receiving or collecting apparatus through a spring the aforesaid ratchet wheel, and consequently the needle of each apparatus, will be advanced an equal distance, the bridge piece will be pushed back, and the alternate course of the current will be re-established. If none of the indicators are in action, then the current led by the second route will nowhere have its circuit completed, and the electro-magnet and the alarum in No. 1 apparatus will consequently not be brought into operation. If the smaller platinum wire in the indicator is by means of the mercury brought into the circuit, then the current goes by this branch line to the electro-magnet connected with the alarum in the mine near the indicator, and the bell is sounded warning the workmen of the danger. The signal is also made observable in the office because the current in the longer wire will also be interrupted by the intermittent action of the alarum in the mine, and consequently the anchor of the electro-magnet in the signalling apparatus in the office will be actuated in rapid succession. The alarum, which otherwise sounds only once or twice, is now sounded in rapid succession. If it should appear to be advisable to have several receiving or collecting apparatus in the mine then they may all be brought into connecfion by the same current from the office.

There is still one requirement left to be fulfilled, which is that the conducting parts of the different circular paths should be so arranged that the small pointer wheel of any one of the pointers should only stand on one of the conducting parts of the circle of any one indicator, while the remaining ones are moving on the intermediate spaces. In such a case one of the receiving or collecting apparatus is to be so arranged that the current may be led through the small wheel on the pointer and to the receiving apparatus No. 3. Here it makes its way through the various parts of the apparatus, and endeavours to find an indicator to make a connection with the return wire; in this manner three or more receiving or collecting apparatus may be joined with one wire circuit. If it should be required only to have the alarum signal in the mine, then a battery has to be placed there and a main wire connection led through the mine, to which are joined the conducting wires from the indicators. The current will then only find a circuit completed in the indicator which is in operation, and only that alarum will sound. The indicator would then only require the said platinum wire first mentioned—the one which passes into the bulb of the thermometer and the shorter of the two other wires.

Freiberg, Sept. 17. —— FRIZETTE.

TRIALS OF SAFETY-LAMPS AT WIGAN.

SIR,—I am obliged for Mr. Ainsworth's answer, quoting from a paper read by the Inspector for the Manchester district, which is so far satisfactory; but what I wished to know was as to the Wigan trials, and I fear I must agree with "M. E.," in last week's Journal, who states that "no information of a reliable character can be said to have been afforded as yet by the experimenters." It would be well that a committee of some of the Mining Institutes should take up the point. Might I further suggest that parties, through your Journal, should note any points which might be useful as tests. Mr. Teale's remarks are not bad. AN ENGINEER.

SAFETY-LAMPS.

SIR,—My attention has been directed for some weeks past to a series of letters in your valuable Journal and other similar scientific papers on the now absorbing and important topic of safety-lamps. Having been myself one of the first to introduce a sytem of lamp which should, while giving a fair light to the worker, constitute an element of safety to the other people in a mine exposed to its influence as well as to the worker himself, and having devoted much time, labour, and expense in testing nearly all the lamps, foreign and home made, I may now, after some years silence, ask for space for one or two observations.

Your correspondents are so far right in stating that the requirements are "maximum of light," with "minimum of explosibility." But *how* is this to be obtained? Mr. Teale and other inventors claim *safety*. Makers and *perfectors* of the Stephenson and Clanny lamps ask for faith in their improvements (?) but what are the results obtained by them?

So far as I have been able to work out the figures given, it appears to me (now a thoroughly impartial onlooker) that each *maker* is endeavouring to *pick a hole* in his competitors' lamps; and this without keeping in view the important points of general utility and safety to life, limb, and property.

If, to settle this controversy, I ask for an impartial tribunal, and if my request is backed up by those most competent to judge—*i.e.*, the managers of "safety-lamp mines" and the Government Inspectors—surely the manufacturers will be the first to submit to the verdict of such a competent court; and fairly to meet the demand by competition in the honest construction and sale of a lamp meeting in every point the requirements of the verdict of such a tribunal.

I would suggest for such a test the many varieties of the Davy, Geordie (Stephenson), Clanny, Mueseler, Teale, Pelton, Williamson; and last, and perhaps least, that of— D. P. MORISON

P.S.—I may add that my experiments were witnessed and attested by the Royal Commissioner appointed by the Belgian Government, and were made with *natural* fire-damp *in situ* as well as with coal gas.

D. P. M.

CAKEMORE, CAUSEWAY GREEN, AND LOWER HOLT UNITED BRICKWORKS AND COLLIERY COMPANY.

SIR,—In my capacity of chairman of this company I reply at once to the letter from "A Shareholder" in last week's Journal, and beg to say that if any previous letter of his (and I have searched in vain for the one referred to) has been allowed to remain unnoticed it has been quite an oversight. To use his own metaphor, we have carefully considered the case of "A Shareholder" and of his co-shareholders, but on looking through the list we cannot find (with but one exception) any symptoms of the "financial ailment" he refers to; indeed, to all appearances there never was a more healthy and robust looking set. As head physician, therefore, I should prescribe complete rest until January next, when a repetition of the dose that "A Shareholder" seems to have swallowed with such avidity some four months since might be administered, of at least equal strength, as a preventive against any slight attacks, which may not unreasonably be expected as a consequence of the usual shower of Christmas bills, and if (which let us hope will not be the case with any) the attacks prove more than transient there will be no difficulty in largely increasing the strength of the doses for the ensuing year.

Joking apart, "A Shareholder" may undoubtedly look forward with certainty to a dividend at the end of the current year of fully 7½ per cent., and far more in after years. To set out all the reasons why any idea on his part of another *ad interim* dividend should be abandoned would occupy too much of your valuable space, but I will shortly state the principal of them.

The "flourishing trade" referred to by "A Shareholder" has—as will be seen on reference to the Secretary's letter in the same day's Journal—only been attained in its present completeness within the last fortnight; and although the company had been making good profits for some time previously, I am afraid the moneys have not accumulated so fast as "A Shareholder" seems to imagine. For example, the almost unexampled depression that existed in the South Staffordshire coal trade at the date of the directors' last communication to the shareholders has not only continued ever since, but until within the last two or three weeks it had gradually increased in intensity, until prices had reached such a point that it was only the peculiar combination of advantages appertaining to this colliery that enabled any profit to be realised on the sales of coal, especially as even at those prices trade had to be hunted up. Under such circumstances, of course, the directors have not been anxious to force on an increase in the output, deeming it far better policy to push on the underground drivages so as to open up more reserves of coal, and to further reduce the cost of winning it by completing the arrangements for doing both the underground haulage and the tramming to the canal wharf by steam instead of horse power.

These two important works—the latter of which expedites and cheapens the delivery of the bricks as well as of the coal—necessitated the erection of two additional pairs of engines with the requisite boiler power, machine houses, &c., and a large amount of work both at surface and underground, and it is by the recent completion of them, and of other extensive additions to the brickworks towards meeting the rapid demand for the splendid quality of bricks now being turned out from thence, that the plant has been brought to its present perfection, and the weekly returns so largely increased. All this has, of course, cost a good deal of money, but it is an outlay which—while trenching upon their present returns—will benefit the shareholders for many years to come, during which it will repay itself over and over again; and I cannot give better evidence of how well it has all been expended than to enclose a letter that has just come to hand from a well known architect and surveyor who visited the property last week—very opportune testimony from two practical authorites, which is the more valuable as it is entirely voluntary and disinterested, and I shall feel much obliged if you would kindly let the copy of it appear at the foot of my letter.

In conclusion, I can assure "A Shareholder" that the directors (who themselves hold a very large stake in the concern) will spare no pains to ensure the continued prosperity of the company; and, basing my opinion upon an extended and varied experience of such properties for upwards of 30 years, I can truly say I have never yet met one combining in itself so many special advantages and so certain to pay—even in the worst of times—handsome profits on its peculiarly moderate capital. HY. J. M'CULLOCH.

London, Sept. 25.

The following is a copy of the letter referred to, and enclosed in the foregoing:—

SIR,—Eloquently as you, some time ago, dilated to me on your Cakemore Brickworks, I was not prepared for anything like the reality, and cannot pass by my recent inspection of them without putting on record my opinion, which, to state shortly, is that they are simply perfect. I have in the course of my professional career, extending over more than a quarter of a century, had occasion to go over numbers of works, many of them more extensive than yours, but I have seldom seen any so compact and so well laid out, and never any that more thoroughly do the work they are adapted for; and I may tell you that Mr. Hodgson, C.E., who accompanied me, fully endorses my opinion—no slight testimony as coming from one who has himself designed many important works, and quite recently, amongst others, the extensive manufactory of Mr. Pease, M.P., of Darlington. What especially struck us was the admirable manner in which everything was laid out to economise labour and space, each process dovetailing in the one with the other, and following in such sequence that from the time the clay leaves the marl-hole until it is carried away in the shape of bricks it seems never to be moved one foot further than is requisite, and always in the direction of the canal wharf or railway station by which it has eventually to leave your property. As for the quality of the bricks, that is undeniable. I myself have never seen as good in bulk anywhere. They are clean cut, sharp and straight at the edges, well burnt, and uniform in colour, and the price at which I was told you could turn them out was so surprising to me that until I had shown me the detailed statement of the piecework prices for each process I could hardly imagine that even the perfection of your machinery could bring down the cost to so low a price. I would strongly recommend you to send the sample bricks to all civil engineers and architects connected with railways. ROBERT BLAND DIXON.

Darlington, Sept. 19.

CAKEMORE, CAUSEWAY GREEN, AND LOWER HOLT UNITED BRICKWORKS AND COLLIERY COMPANY.

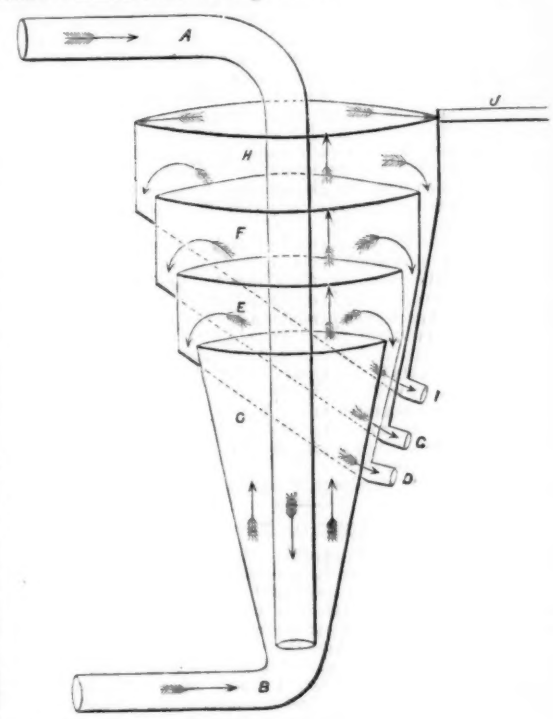
SIR,—There is a misprint in my letter of the 17th inst., for which doubtless the hastiness of my scribble is responsible, but as it somewhat affects the context I shall be obliged by your noticing it. Referring to the 7½ per cent. dividend, I am made to write "received in *my* last," it should read "received in *May* last."

Perhaps, while I am on the subject, I may be allowed to make another suggestion to the directors. Why not apply to have the shares quoted on the Stock Exchange list? There can be no doubt as to the *bona fides* of the company, and I should have supposed that it was of sufficient importance to obtain a quotation. I may be answered, as I was months ago, when I made the same suggestion, that to a company where every shareholder is a *bona fide* investor, a Stock Exchange quotation matters not; but I differ strongly from this view. Shareholders may die, and their executors be compelled to realise the estate, and even during lifetime circumstances may occasionally render the realisation of an investment desirable, however good it may be, and I personally plead guilty to a fancy (which I believe many others share) of seeing my stock quoted from time to time. I have, what is for me, a considerable sum invested in the concern, and am so satisfied with the investment that I have no intention of selling, but I should like to see every 100*l.* I have in it marketable at 150*l.* or more, as I quite believe it would be were the company more known, and it is with the directors that it rests to do this.—*Walbrook, Sept.* 23. —— A SHAREHOLDER.

TREATMENT OF TIN ORES.

SIR,—In my letter on this subject last week I expressed my conviction that a great change is about to take place in tin dressing, and remarked that although machines for the treatment of sandy matter have thrown the round buddle entirely in the shade we are still in want of a good slime dressing machine. This slime ore is now treated on what is called the frame, which is simply an incline plane made of boards. The ore being heaviest, it settles on the frame, whilst the lighter waste is carried back over the lower end or tail, and all light particles of ore which are not heavy enough to resist the current of water are carried back with it, consequently a partial separation only results, and hence the great loss of tin. This defect in this mode of dressing has long been known, and with a view to remedying it I have contrived the following apparatus, which instead of subjecting the ore to one uniform current, such as that of the incline plane, subjects it to three different or more currents, which prevents the loss of the fine ore.

The adjoining is a vertical sketch through the centre, which will suffice to illustrate the *modus operandi*.



A Inlet pipe for slimes.
B Inlet pipe for clear water under pressure.
C Funnel in which the slimes become intimately mixed with the water.
D Outlet for 1st quality ore.
E No. 1 pan, or enlarged passage, in which the 1st quality ore becomes separated.
F No. 2 pan, or passage further enlarged, in which the 2nd quality ore becomes separated.
G Outlet of 2nd quality ore.
H No. 3 pan, or passage still further enlarged, in which the 3rd quality ore becomes separated.
I Outlet of 3rd quality ore.
J Outlet of waste.

The inlets A and B and outlets I, G, D can be regulated by cocks or by plugs governed by screws, which are not shown here. The apparatus is first filled with water, and then the slime and clear water are admitted through A and B, which meet at the bottom of the pipe A, and flow upwards together through the funnel C. The purpose of this compartment, C, being entirely for the proper mixing of the clear water with the slime, the pressure of the water in B being sufficient to carry all the ore over the top of the funnel into the pan or enlarged passage E, where evidently the current becomes weakened by this enlargement, and is no longer capable of carrying the heavy particles of ore upward, which, consequently, here enters into a state of equilibrium, and becomes drawn off, as shown by the curved arrows, by the current produced by the outlet D. The waste and lighter particles of ore are carried on into the pan F, where the enlargement further weakens the current, so as to allow the 2nd quality ore to enter into equilibrium, when it is in like manner drawn off by the downward current produced by the outlet G. The waste and any light particles of ore it may now retain is carried on to the pan H, where the current becomes further weakened in a similar way, so as to bring these light particles of ore also into equilibrium, and allow them to escape in a similar way through the outlet I, whilst the waste is discharged through the outlet J.

It will be easily conceived that by extending this principle an indefinite number of different specific gravities of ore can be easily obtained, and that every particle of ore which it is possible to collect by its superior specific gravity to that of the matter with which it is

associated, which is the only known means in wet dressing, can be easily collected by this principle in one automatic operation. It will be easily conceived also that the ore not only becomes separated, but at the same time becomes classified, which is an all-important desideratum in all wet dressing. For instance, in case of tin dressing the ore herein separated would of course be calcined and re-washed, or, in cases of other ores, such as lead, copper, blende, &c., where it might be desirable to further enrich the 2nd and 3rd quality ores by re-washing, the advantage of classifying will be evident to all practical dressers. In fact, perfect classification may be said to be the key to perfect dressing, or, in other words, it is the only means of solving the difficulty experienced, and preventing the enormous waste so much complained of.

This apparatus, as may be seen by the sketch, is very simple in structure, and may be made of sheet or cast iron. It is very durable, there being no wear and tear other than the flow of the water, and when once regulated requires no attention or lubrication of any kind. It is fed automically, and may be made of any size to suit requirements, and would, as here shown, with three pans, never exceed 3 ft. 6 in. in height for any diameter. It is also very expeditious, one of 16 in diameter being equal to 35 ordinary frames.

The greatest objection which will be raised against it is the difficulty of procuring clear water, which is certainly more imaginary than real (*vide* my letter of last week), but, however great it may be, there is one thing certain—that slime ore will never be dressed without great loss unless clean water is procured In fact, every dresser will admit that the loss of tin is occasioned in a great measure by using thick muddy water. W. NANCE.

North Shields, Sept. 24.

TREATMENT OF TIN ORES.

SIR,—Apparently Captain Southey ignores my assertion that a complete separation between fine tin and crop, such as is effected by his jigging process, results in an unnecessary waste of tin in slimes. Captain Southey states his "argument to be classification from the front of the stamps." This is old, and will soon, I trust, be obsolete. The tin-yard, and not the front of the stamps, is the place for classification. Captain Southey says the round buddle is a bad separator. True, it does not thoroughly separate crop tin from slime, and it is fortunate that it does not. It does, however, separate tin from the matrix, and in this sense is a good separator. I repeat my former statement, "the round buddle (in front of the stamps) into which slimes and roughs are received pell-mell, is effectual in making the roughs react upon and comparatively un-tin the slimes. In other words, the roughs form a filter, through which, assisted by the sweeps, the slime tin is filtered. The light slimy waste (not half so rich as that from the jigger) is reserved for future treatment, and a large proportion of the fine tin (effectually rescued from the slimes) is saved with the crop." Captain Southey in his first letter claims for his process that it separates the crop from the fine tin, and "leaves the slimes pure and simple to be dealt with" by framing. Now, there is not the slightest difficulty in saving crop tin. Several times the roughs on the Red River have been tried, in most cases to be quickly abandoned as worthless. The all-important question is, "How can we untin the slimes?" This question, which I put in *italic* in my last letter, Captain Southey takes no notice of. He admits his jigging process cannot answer it because he "leaves the slimes pure and simple to be dealt with" by framing. Framing does not do it (see Red River outfall). Of all things yet tried the round buddle in front of the stamps acting as shown above gives the most satisfactory results.

It is useless talking and writing any more on the subject. A practical test is the only way to a mutual understanding. Let Captain Southey, in the interests of Cornish tin-dressing, place a convex round buddle, of 21 ft. diameter and 10 ft. centre-head, directly in front of his stamps, and turn into it the "slimes and roughs pell-mell" coming from stuff of average produce (say, 40 or 50 lbs. to the ton), and I will undertake to prove experimentally that the slimes running away from that buddle shall not be so rich by *at least* 40 per cent. as the slimes from the jigging or any other process yet introduced. I wish it to be clearly understood that I recognise the jigger as an efficient and cheap separator of slimes and roughs; but I maintain that such separation is not only unnecessary but unwise, and results in forming comparatively rich slimes, which cannot be thoroughly treated by framing.

With reference to the labour cost saved by the jigger, we should guard against throwing away a ton of slime tin to save 20*l.* in labour, and where such delicate stuff as tin slimes has to be dealt with it is a very easy matter to lose tin in very considerable quantities. Slimes should be rendered as poor as possible in the first operation.

When more remunerative prices are obtained for our staple commodity, and our mines can better afford an outlay, doubtless we shall see many improvements in the apparatus for treating slimes, and in other departments as well. Certainly many may say it will pay to make these improvements at once; but those who know the difficulties experienced in collecting and paying call after call from many of our Cornish mines during the depression would probably prefer waiting for better times. CHAS. THOMAS.

Cook's Kitchen Mine, Camborne, Cornwall, Sept. 23.

TREATMENT OF TIN ORES.

SIR,—With your permission, perhaps the correspondence that has recently taken place in your valuable Journal by Captain Southey and others on the dressing of ores might be supplemented by some remarks from a person interested in the dressing of lead ores in Wales, who readily acknowledges the more intricate nature of tin ore to manipulate, but who thinks that the main principles of treatment are relevant in each case. I need hardly remark that stone-breakers, jiggers, and different classes of buddles have for some years been at work in the best managed mines of the Principality, and perhaps our Cornish friends will excuse me for thus intruding into the present correspondence, my excuse being that the principles of ore dressing are similar everywhere, and that we have had some experience with different machinery in our Welsh Mines.

First of all, with regard to hand-picking ores; the mode adopted on the Continent, and described so well by Mr. Nance in your last issue, is the one usually adopted in our mines. Without exception I might say when treating the gangue of lodes of the clay-slate or Silurian system, where the grains of ore are more disseminated than in the productive and concentrated bunches of galena found in the lower carboniferous measures, there would be considerable loss in ore, in time, and labour if the almost pure ore of the latter strata was allowed to pass through the stone-breaker and the crusher rolls. The usual mode is to pass the richest portion through the crusher only, and to pass the more unproductive stones through the breaker and crusher. With regard to ores of the clay-slate lodes, they are trammed into hoppers, washed by a sprinkling of water, and then pass through to a revolving table, where the unproductive stones are separated by boys and girls. If this system be found necessary with lead, I think it a strong argument for its general adoption in the classification of tin, where there is a less percentage of mineral in the matrix dealt with. From the picking tables the orey stones are transmitted in trams direct to the stone-breaker, the finer particles washed off at the hopper of the picking table are conducted to the crusher rolls by the small stream of water used at the hopper and table. A little water is allowed to pass through the stone-breaker to prevent clogging, and the crusher rolls are so fixed below the stone-breaker that a launder with a slight declivity carries the stuff direct into the rolls from the breaker. A raft wheel is always used for elevating the coarsest sized ore back to pass once more through the crusher. After the passage through the crusher rolls the general classification of the ore commences, and in the proper arrangement of this classification has been found the success in the after treatment and separation of the ore. The bulk of the crushed ore passes through from the rollers along a launder to three or more different circular classifying sieves, gradually diminishing in size of mesh, and so arranged that each size of ore passes into a separate jigger, which, as a rule, vary in number from three upwards, according to the quantity of work to be done. In some instances the whole of the stuff passes into one large plunger jigger after one classification only, but the quantity of stuff to be thus treated by a single jigger necessitates the use of an extra strong pressure and a large quantity of water. This system, I believe, will be admitted by experienced dressers to be a mistake. Where the pressure of plunger power is great, and the flow of water large, a quantity of the finer particles of the ore are sure to carried away with the water, and will entail much more labour and difficulty when treating once more the refuse of the first manipulation, and a loss of silver will from the same cause be a certain consequence. A large jigger working thus gets through a deal of work in a short time, but I believe the loss of ore is greater than the advantage gained in dispatch of stuff. It is one point that certainly should be avoided in adapting plunger jiggers to the dressing of tin ores. Practice has proved that it is best to adopt three or more medium sized jiggers (according to the quantity of work to be done), using a minimum supply of water for their working, and so arranging them as to made a nearly perfect separation of the ore from the stuff treated on. The great secret of success is to classify the stuff throughly and take out as much slime as possible before it passes into the jiggers. This is done in our lead mines by erecting boxes in the shape of an inverted cone, intermediately between the sieves that supply each jigger. A pressure of water is applied by a pipe at the bottom of the cone or box, and the slimy part floats uppermost, and is carried on to the buddles for treatment, while the heavier particles pass downwards into the jigger. Captain Southey says in your last issue that "the round buddle is a bad separator, and worse classifier." With regard to buddles and the treatment of slime many attempts have been made from to time to time to supersede the common round buddle as a separator of slime, but so far nothing, that I am aware of, has been found worthy to replace it in lead ore dressing in Wales. Classifying of the coarser particles must be made as perfect as possible by the application of sieves for the jigger, and classifying of the slimes must be also improved upon by the extension of the cone boxes previously mentioned. Let separation be left to the jigger and the round buddle, and classifying to the other auxiliaries mentioned; such is our present practice in lead ore dressing, and I believe they are the principles, in the main, which Captain Southey wishes Cornishmen to adopt in the dressing of tin ores. For details of working I would recommend Cornish tin miners to see the machinery at the Va n Mine, and other mines in Montgomeryshire, also those erected by Messrs. John Taylor and Sons at Minera Mine, Denbighshire, and Foxdale Mine in the Isle of Man, also those erected by Mr. George Green, of Aberystwith, in Cardiganshire, and other counties. Some of the above-mentioned machinery is treating satisfactorily orestuff with as little as 4 per cent. of mineral in the matrix. W. S.

THE SMELTERS—COPPER, TIN, AND LEAD.

SIR,—There appears to be a very strong feeling against "the smelters" buying the ores of our British mines, especially in the purchase of Cornish and Devon minerals. It is said that the mining companies are entirely at the mercy of the smelter, and that he can give whatever he likes, or rather what the smelters as a body like to fix, With the wonderfully improved methods of smelting, why cannot some of our tin and lead mines combine and smelt their own ores? Then, again, why cannot the few copper mines combine and smelt their own ores; or, if not, why not do away with the farce of (so-called) Cornish ticketings, and such mines as South Caradon, Mellanear, South Tolgus, Devon Consolidated, Marke Valley, Gawton, Gunnislake, Bedford, and a few others, sell their produce at the Swansea Ticketings, where there are twice or three times the number of copper smelters, and I know for a positive fact that many of these Swansea copper smelters could afford and would give 10, 15, and 20 (in some cases near 25) per cent. more than the mines have been obtaining at Cornish ticketings. This is such a matter of vital importance to Cornish and Devon mining companies, as well as to the lords of the minerals in the amount of royalties received, that I hope managers and shareholders, as well as lords, will open their eyes and ears to what is going on. The numerous Swansea smelters want the poor class copper ores for mixing purposes, and would give much better prices than the few Cornish ticketing smelters (some four or five), who give just what they please, having no competition. Who will bell the cat? Where is John Taylor and Sons? What do they say? They are managers of West Tolgus and Mellanear, why not buy these ores and mix with their rich Cape Copper ores, and start smelting works of their own? They are lead smelters, why not copper?—*Truro, Sept.* 24. MORE ANON.

THE MECHANICAL TREATMENT OF ORE

SIR,—The letters on the subject of tin dressing by Capt. Southey and others, now appearing in the Journal, are of a very interesting character. If the subject is discussed in a calm and judicial spirit much good may follow. Some ten years ago Mr. Darlington urged the use of a long continuous jigger in connection with suitable classifiers for concentrating tin ore direct from the stamps, and lately the employment of continuous jiggers for concentrating the auriferous sand from blankets and revolving strakes previous to treating such sand in pans or arrastres. To many of your readers it may be useful to state that Ure's "Dictionary of Arts and Manufactures" contains a paper by Mr. Darlington, some 90 pages long, on dressing machinery. Almost every kind of jigger and classifier is illustrated and described; the speeds of the various jiggers are given, together with the grain size of the stuff to be jigged. In addition, the difference between sizing grains by volumes, so as to obtain difference of density, and sizing by equivalents to secure difference of volume is clearly treated. It is much to be wished that Mr. Darlington, with his intimate knowledge of the home and continental systems of ore dressing, would favour your readers by publishing in the Journal a paper on the mechanical treatment of ores. He would, I think, clearly enunciate the principles on which all water dressing must be based so as to concentrate the ore cheaply and effectively.

Almost any free grain sand of the smallest dimensions can be successfully jigged and separated, provided the water be clean, and the advantage of a jigger over a buddle is that whilst a buddle can concentrate only by arresting the surface velocity of the grains, which vary with their density, the jigger includes this function with the more important one of parting the grains, separating and securing them by their different density. In fact, the jigger is the more scientific, and may be made the more successful, ore-dressing apparatus. In Germany (as I observed when lately visiting several mines there) the round buddle is largely superseded by the jiggers. At the Commern, Moresenet, and other mines, where hundreds of round buddles were formerly employed, all have long ago been superseded by concentrating continuous jiggers. At Clausthal the same practice has been followed, and I feel confident that if experiment follows this discussion the Cornish huel will make the same change in its dressing arrangements as the German— GRUBE.

London, Sept. 25.

THE MONOPOLY OF THE WORLD'S CONSUMPTION OF STEEL BY SWEDISH LAPLAND.

SIR,—The Times of this morning, in announcing the opening of the meeting of the Iron and Steel Institute, at Liverpool, this day, states:—"Two papers are to deal with the steel manufacture; the treatment proposed in such have been applied in a variety of ways. It is not likely that the so-called neutralisation of the phosphorus by some new kind of physic *(sic)* will meet the requirements of the case." Göethe, of imperishable fame, wrote—"Ausfuehrlich und umstaendlich wie es der Deutsche liebt" should animate our mode of procedure so as to come in possession of a clear definite conception, enabling the logical value of a scientific argument to be tested. "Quid obseratis auribus fundis preces Hor." No flowers of rhetoric nor fund of forensic skill are able to dispel the conviction that the halycon days of the iron period have passed into the limbo of oblivion, and it is illusory to draw upon imagination for facts. The "nuda veritas" remains that to obtain an entirely pure steel free from phosphorus and sulphur we have only one practical locality to go to, which is the Gellivare district, in Swedish Lapland. As able men as any now sojourning on the right bank of the Mersey have made innumerable attempts to improve the steam-engine, and yet, with the exception of working high-pressure steam expansively, and by this means economising fuel, there has been no change in the principle of the steam-engine, either in its condensing or non-condensing form. It is still the engine of Watt; his name is stamped as indelibly upon it as Newton's upon the law of gravitation—and so it will be with their steel research. They will never be able to manufacture a pure steel free from phosphorus and sulphur with the ore within their reach and the Bessemer or other existing processes.

20, *Little Tower-street, Sept.* 24. WM. JOSEPH THOMPSON.

MONOPOLY OF THE WORLD'S CONSUMPTION OF STEEL BY SWEDISH LAPLAND.

SIR,—My letters in the Journal of August 16, 23, and 30, and Sept. 13 showed the Gellivare ore contained upwards of 70 per cent. of pure iron. Dr. Petermann's (no more trustworthy chronicler existing) "Mittheilungen ueber wichtige neue Erforschungen auf dem Gesammnt-gebiete der Geographie" informs us that "The Lapland ore has been found to contain 74 per cent. pure iron." A scientific voyage by command of the French Government in the corvette La Recherche to Lapland reports that "between the Rivers Tornea and Lulea there exists an extremely rich metallurgical district, masses of oxide of iron of immense strength—for instance, at Gellivare, in Lulea, Lapland, &c."

At the annual general meeting—March 28, 1876—of the Iron and Steel Institute Sir Henry Bessemer said—"He had tried almost every variety of English iron, and with almost every one he was unsuccessful. He then thought it necessary to try if he could obtain some comparatively pure pig-iron, or such at least as was free from phosphorus and sulphur, for which purpose he obtained some Swedish iron, and the result was most satisfactory, proving the fact that if they had to deal with pig containing only a minute quantity of these ingredients they could produce an excellent result, which circumstance gave him heart to proceed again." The Gellivare ore, according to a Swedish Government report, is entirely free from sulphur, and only in some situations a small percentage of phosphoric acid. My letter in the Journal of Sept. 13 shows that Gellivare is assigned a place preceding even the Dannemora ore, which latter contains only 0·003 per cent. of phosphorus. At their 1877 annual general meeting a paper was read by Prof. Akerman "On the most recent advance in the Manufacture of Iron and Steel, as illustrated by the Paris Exhibition," which stated—"Much railway material of Bessemer metal was exhibited, the opinion of its goodness, after many years' operation, being so little established that there were works which sought to conceal their Bessemer products under a fictitious appellation. The experiments made show how enormous is the influence of phosphorus on the power possessed by iron of resisting blows." A paper read on "Experiments referring to the Use of Iron and Steel in High-Pressure Boilers," at the general meeting of the Institution of Mechanical Engineers, June 19 last, of too prolix a nature to quote *in extenso*, shows the immense inferiority of the steel supplied by some of the most experienced makers of steel in strength and hardness—the harder the steel the greater its tenacity, the want of which proved to be a very serious disadvantage, the London and North-Western Railway Company making nothing but steel boilers.

It is of no use blinking or shirking the question. Swedish Lapland is the only "provenance" or locality hitherto known which can supply us with the highest class, or, indeed, any class, of steel free from phosphorus and sulphur. The Cronica de la Industria, Madrid, 15 de Setiembre de 1879, gives a description of "Las Minas de Somorrostro," near Bilbao, whence the largest quantity of iron ore is exported to this country, the 1878 import from Spain being 1,088,862 tons, and from all other countries 84,549 tons. Anyone who has travelled in Spain, and has had to approach the "brasero" to procure an alleviation of temperature in the penetrating cold of the North of Spain, will confirm my allegation that indigenous charcoal for important industrial purposes is not to be had in Spain. I have travelled frequently in Lapland at interrupted intervals, and sledging with 35° Celsius or centigrade below freezing point, I have suffered less than I experienced during a winter sojourn in the Basque district, where I found the consumption of charcoal even for household purposes extremely restricted and economised. A mail steamer of 3000 horse power which had proceeded on her voyage from Europe to New York as far as the Banks of Newfoundland, meeting with a hurricane, lost her Bessemer steel screw blades, made in this country. She was compelled to put back under canvas, and, making Scilly, was brought into Plymouth, where she repaired her damage with the spare blades she carried with her in Devonport Royal Dock. I witnessed the very defective state of the broken blades, not wholly detached from the main shaft with the occurrence of the disaster, which were (technically) honeycombed or crystallised, What a serious loss to so large a steamer and her numerous passengers. I have been directly involved myself in minor disasters with British iron, of which I beg to cite two instances—one in the extreme North and the other in the extreme South of Europe—Russia and Spain. I exonerate the manufacturers, men of the highest standing in the industrial world, but the system has done incalculable, if not irremediable, injury to this country's industrial prestige. I sold malleable iron to Russia, which when heated fell to pieces—cinder-mixed iron. I delivered telegraph wire equally circumstanced, but from another district, to a railway company in Spain, which was so bad that it would not stand the most lenient, far from ordinary, torsion. I have been at both places of destination subsequent to the receipt of the iron and wire, so this is not hearsay.

The Times of Sept. 17, in a leading article, states—"The malleable iron trade is a dying industry, one-half of the puddling-furnaces in the North of England, Staffordshire, and Wales are already cold, and extremely unlikely to be ever again restored to animation. At the end of 1878 about 500 blast-furnaces were entirely idle. There will be a general substitution of steel for iron, which within the last five years has been reduced from 14*l.* to 4*l.* 10s. a ton. Steel rails, with a longer life, are produced with one-third of the labour and one-fourth of the fuel required to produce an equal quantity of iron." I shall terminate this subject by adding that phosphorus for many years has been the great trouble of ironworkers in this country, and the attempts to eliminate it economically have been as persistent and fruitless as the search for the philosopher's stone. The world's supply of steel is within the reach of Swedish Lapland, and, divesting myself of every pretension to self-worship, I humbly stand forward as the pioneer of exploitation of an incalculable deposit of wealth, the intrinsic merits of which are already so firmly established.

I reiterate in the most emphatic manner the intrinsic value of the Gellivare property is incalculable, in the judicious and energetic development of which the world at large is deeply interested, and that at no previous period has such an auspicious opportunity presented itself for its exploitation.

Viewing the position of the company, previously adverted to by me, the loss of 98,212*l.* 11s. 3d. to Oct. 31, 1878, according to the latest balance-sheet before the general meeting of shareholders on July 31 last, I submit the true state of the undertaking is much more unfavourable, as shown in the sequel. I find 819*l.* 0s. 11d. for survey of forests interlaced with the assets, which ought to be carried to profit and loss account, also before the meeting in the same manner as salaries, &c. In similar manner 1364*l.* 12s. 3d. contribution towards railway preliminary expenses. The Chairman of the meeting laid great stress on the company not being implicated in any further direct or indirect manner in the scheme, the most influential member of the board stating—"The future of the company really depended entirely upon the course of prices," and otherwise expressing himself very reservedly, if not disparagingly, of the railway project to an ice-bound port. On the basis of the loss sustained on the iron consigned to London, the loss on iron account cannot be computed at less than 15,000*l.*, and if we assign to the ironworks of the company a relative value with authentic proceedings in the sale of Cleveland ironworks this month, there ensues a minimum loss of 12,000*l.* On the basis of the latest sales of wood goods by the company a further loss of 4000*l.*, and on steamers of 3000*l.*—total, 36,183*l.* 13s. 2d., added to 98,212*l.* 11s. 3d., as above, shows an aggregate loss of 134,396*l.* 4s. 5d. I am unable to form any estimate of the important entries—48,005*l.* 9s. 4d. for current works, &c.; 18,260*l.* 17s. 3d. stock, &c., and 10,737*l.* 4s. 8d. provisions. I now approach a term which opens out a more favourable and redeeming aspect, dependent upon

a total reversal of management in Sweden. As, for upwards of 25 years, Russian consul at one of the leading ports in Europe, and for a lengthened period a householder in St. Petersburg, I have been extensively engaged in the negociation of forest concessions in Russia in which empire the mere royalty—"redevance"—paid by saw-mill owners in entirely distinct districts in the extreme North, close upon and actually within the Arctic Circle, with an extremely limited period of open water, far less than the new Gellivare Company (Limited) enjoy at Lulea, exceeds the cost of logs, felling, transporting, and floating to their saw-mills, whence a much reduced freight to England to what is paid from the said Russian ports. The cost charged in the accounts for transforming the log into deals, battens, or boards is far too much, and upon this head I calculate a considerable saving. Considering the cost of the two saw-mills at Altappen and Munksund and the other saw-mills, I assert that a much larger output is practicable. I shall enumerate under three heads the saving which can be effected—to the extent of 3*l.* per St. Petersburg standard hundred—by a remodelled *modus operandi*, covering thus the interest of the mortgage loans, and giving a 5 per cent. dividend to the shareholders. Now, this is entirely apart from the proposed system of steel manufacture and transport by rail as explained to an always open port in the West of Sweden, which I am confident will follow in due time, and which is naturally my great goal:—1. A great saving in the manufacture of deals, battens, and boards from the logs, by no means based upon an amelioration of wages, but otherwise.—2. A reduction in cost of freight from Lulea and Pitea to the North Sea to the extent of a moiety, upon a system denuded of any novelty in principle or construction, and only in a practical appliance, without any outlay on behalf of the company except as far as lighters are concerned.—3. By cutting up the logs to suit the French, Belgian, and more distant markets, in addition to the English, much better results can be secured than the present system of shipping all qualities and dimensions to London, an extremely unsuitable market compared with a general export trade, as practised by other saw-mill owners laying themselves out for such. I am prepared to substantiate my statements, by the highest-class credentials, to the satisfaction of the mortgagees.

WM. JOSEPH THOMPSON.

20, *Little Tower-street*, *Sept.* 23.

COLOMBIAN MINES COMPANY.

SIR,—In a late number of the Journal I read a letter from Mr. Gray urging the shareholders in the Colombian Mines Company to look into their affairs before it is too late. My object in writing is to try whether through the medium of the Journal some of our influential shareholders may be induced to come forward and insist upon our directors calling a special meeting and placing before it a full account of the past and present condition of the company. Shareholders trust too much to their directors and managers, and forget that the first duty of the directors is the good of the company. This is too often ignored.

As a company we seem to be almost at the last gasp. Other companies have been as near to their end, yet with vigorous treatment and careful nursing have lived and become valuable. With a new agent in Mr. Welton's place, and a few new directors, we might yet weather the storm—if the Malpasa, Rica, and Malabar Mines are worth what was paid for them, and what was said of them in the monthly and annual reports. Was not Mr. Welton a part vendor? if so, were the directors justified in making him the manager? Will not some of the shareholders enquire into this and other matters before it is too late?

A SHAREHOLDER.

MINES OF UTAH—THE BINGHAM CANYON.

SIR,—I am informed through you, under date of Aug. 16, that the Bingham Gold Mines are on the French and Belgian markets. It is my duty to inform you, and the public through you, that the Bingham gold ore deposits are in my belief only surface deposits, and that they do not extend below the pyrites level, which said level had already been reached months ago. I assert positively my belief that the Bingham Gold Mines will be only short-lived, and the highest value of the Stewart and Stewart No. 2 is $100,000. I further declare that persons who estimate the aforesaid mines at a higher figure do so, in my opinion, without an accurate knowledge of their value, and that their opinion so expressed may tend to delude and impose upon capitalists and buyers.

W. BREDEMEYER, M.E.

Salt Lake City, *Sept.* 6.

P.S.—The Oregon and Butte Mines in Big Cottonwood (the Oregon is owned in Canada) are doing very well, and are opening extensive ore deposits. The Winamuck and Dixie Mines, in Bingham, are at work under the new management with full force and very good prospects. The Emma, Toledo, Vallejo, Richmond, and Little Cottonwood continue sending very valuable shipments of ore. W. B.

NEW QUEBRADA COMPANY.

SIR,—As the directors of this company do not seem to have carried out the promise made by the Chairman at the meeting of shareholders in June last—that they would endeavour to issue monthly statements commencing with July—I beg that you will permit me to ask, through the *Mining Journal*, if the following figures are correct? and if they are not, if the directors of the New Quebrada Company will furnish such information as shareholders were led to expect from what was stated at the meeting in June:—

	Tons.	Per cent.	Price per unit.		Per ton.	
July.....	1360	..... 11	10s.	9d.	..... 118s.	3d.
Aug. ...	670	..... 12	10	7½	 127	6
Sept. ...	900	..... 14	11	3	 157	6
„ ...	450	..... 12½.....	10	7½	 132	10½
„ ...	350	..... 20	10	10½	 217	6
„ ...	380	about.. 12	10	10½	 112	6

„ 23... a cargo (but no quantity given) at 11s. 7½d. per unit.

If these figures are correct, more has been realised for copper ore in less than three months from July last than in the preceding six months, and I hope I am not wrong in my expecation of a dividend this year of about 7s. 6d. per share.

T. L.

London, *Sept.* 26.

GAS POWER LOCOMOTIVES FOR TRAMWAYS.

SIR,—Several enquiries as to the the application of engine power on the street tramways of London having been made in the *Mining Journal*, a description of the new gas power locomotive for tramways, invented by Mr. Conrad Krauss, of Hanover, may not be uninteresting, more especially as the arrangement may be considered as practicable, because the several parts which are combined have each been in common use for other purposes and succeeded. In the first place the gas is compressed to the desired degree—say, 10 atmospheres— by suitable pumps and delivered into reservoirs or accumulators, where it is kept ready for supply to the reservoirs of the engine. The filling of the latter, therefore, requires but very little time after the connections between them and the station reservoirs have been made; consequently there is no material detention of the engines on this accout. Substantially the arrangements for the compression of gas may be made similar to those already employed for the purpose of lighting railway carriages. The size of the engine reservoirs must, of course, be adapted to the special circumstances, but they may be made large enough to contain a quantity of compressed gas sufficent for one or several hours work. To the reservoirs a pressure regulator is attached, which causes the gas to issue at a certain lower and constant pressure, although the pressure within the reservoirs decreases during the working. On its way to the cylinder of the engine, the gas is mixed with compressed air having the same pressure as the gas. For this purpose the engine is provided with a pump by which air is compressed into an air vessel having a suitably weighted safety or escape valve, so that the air pressure is maintained at an even standard. From this vessel the air supply for the engine is taken. Before starting the said vessel has to be filled with compressed air by a hand-pump. The gas is mixed with the air by an arrangement similar to an injector, which allows the proportion between the two to be regulated, and which causes them to become intimately commingled.

Hitherto the adoption of gas engines for tramway cars has been difficult, owing to gas-motors, I think without exception, having to be started by hand; and to start a tramway car by hand would be out of the question. Mr. Krauss surmounts this obstacle ingeniously. As it would be unsuitable to stop the motor every time the engine or carriage is stopped at a station, it is requisite to provide an arrangement which allows the gas-motor to continue running meanwhile. For this purpose motion is transmitted from the latter to the driving-wheels of the engine or carriage by friction wheels, which are pressed together during the running, while they are brought out of gear with each other when the engine or carriage is to be stopped. By these means at the same time every jerk is avoided in starting, as a partial slipping of the friction wheels may take place until the resistance caused by the *vis inertia* of the locomotive or carriage is overcome. With the described friction wheels a special arrangement has been combined for allowing the driver in case carriages have to be shunted &c., to reverse the motion of the locomotive without stopping or reversing the gas-motor. Provisions have also been made by which the gearing which transmits power to the driving wheels may be changed during the running, so as to lessen the speed when gradients have to be overcome, and thereby to obtain a greater tractive force with the same motor. A decrease of power of the latter may be caused by lessening the supply of gas to the cylinder, or by working with gas and air of a lower pressure, Full means are thus given for varying the power respectively the force of the motor within certain limits.

The frictional gearing by which power is transmitted from the gas motor to the driving axle may be arranged in various manners. Instead of causing the friction wheels to act on the driving wheel as described a wheel fixed on the shaft may work together with a friction wheel keyed on the driving axle; moreover the periphery of the wheel may be either cylindrical or provided with V-shaped grooves. The arrangement is very simple and very easily manipulated.

Sept. 22. DRIVER.

THE DUTY OF CORNISH PUMPING-ENGINES

SIR,—The cost of fuel to drive our steam-engines employed for the purpose of pumping, which are generally constructed to carry out the principles of expansion and condensation, forms a serious item in the total expenditure of many of our mining companies; and, whilst there is every reason to conclude great attention is paid to the obtaining coals for them at the best prices, yet I believe the question of the duty the engines perform in the consumption of the same is seldom discussed at our public mine meetings. All, I believe, fully agree that our mining requires every possible economy carried out in every department, and while great attention has, doubtless, been paid to the subject generally, the question of the "duty" of our pumping-engines seems, however, not to have had that attention paid to it of late years that its great importance entitles it to.

The "duty" performed by these kind of engines formerly (many of them) greatly exceeded that performed now; and the difference is so great as to amount to a large percentage. It may be argued that the fuel formerly used was of a better quality than that used at present. Granting that it might have been so, the difference in the quality of fuel would not be sufficient of itself to account for the great difference in duty. Mine agents and the engineers are quite as alive to the importance of using good fuel now as they were formerly, and the causes of diminished duty must be looked for elsewhere. They are mostly embraced within the two following heads: Insufficient boiler capacity and too heavily loading the piston. The evils of insufficient boiler capacity are shown in a great number of ways of more or less degree, all uniting to contribute towards one result—the least quantity of power generated for the greatest quantity of fuel consumed. Contracted boiler room generally means forced fires (and very often much more), and forced fires mean waste of of heat, and waste of heat means loss of money

With respect to the over-loading the engine, the best principles of the application of expansion are generally interfered with, more or less. Very often the top steam has to be continued on for a longer portion of the stroke than is consisient with economy. The vacuum power varies in proportion to the perfection condensation is carried out; and this power forms under any circumstances, when the principles of condensation are applied with proper results, a large set-off in the scale against the lode in the shaft. But its economising results are more particularly brought out by the relative proportion it bears to the lode in the shaft, weight for weight, or rather force against weight. The following illustration will suffice to convey a tolerably correct idea to those who are not used to study the subject. Suppose the relative value of the vacuum force be about 25 per cent. of the load in the shaft, it follows if the area of the piston is increased for the same load the vacuum power, which increases in proportion to the area, stands in a relatively higher proportion to that load; and if the area of the piston is increased one-half the vacuum force, instead of forming a counterbalancing power of 25 per cent. of the load in the shaft would be 50 per cent. Therefore, the economising principle of lighter loads is fully borne out on this head also.

The cultivation and application of a proportionably large vacuum force to the lode of the engines was certainly one of the reasons whereby the higher duties were formerly performed by many of our engines, and such great economies effected in fuel. It follows that the adoption of the same principles would produce like results. While, then, it is contended that the general application of greater boiler space and lighter load would greatly ec onomise in the cost of fuel, it by no means folllows that these are the only sections in connection with the subject in which evils against economy crop out. There are other considerations which equally are concerned, and which very often—indeed, too often—are the causes of considerable loss both in time and money, Contracted boiler space and overloaded engines very often mean in practice water in the workings, slow progress, capital gone through, and the objects of the company's operations not attained to, or only partially so. Case after case might be pointed out where contracted pistons and boilers have not only been perpetual sources of diminished economy, but have effectually retarded operations and often wrecked the company.

Sept. 23. GEORGE RICKARD.

LLANIDLOES DISTRICT, AND MINING DEPRESSION.

SIR,—In the midst of the depression that surrounds us on every side, and the severe blow giving to mining in this once flourishing district by the discharge of a great number of miners and a comparative number of surface hands from the Van Mines in consequence of the present low price of its produce. Here between brackets I would like to re-echo the remark made by a writer in the Journal a few weeks ago "that the directors of the Van Mines deserve all praise for their prompt action and foresight in curtailing the output when they did." But I see I am gliding smoothly from the subject that prompted me to pen this letter, in which I wished to cheer and congratulate Llanidloes and its surrounding hamlets on the possibility (and, from what I have seen, the certainty) of their being able yet to claim priority over other districts in the Principality for their remarkably rich mines. Being in a village a little to the north-east of the Van Mines I met a person who showed me some of the finest lumps of lead and lode that any miner would wish to see. They were not pure lumps of lead, but mixed up with the very blossoms of a rich deposit of lead, and covered over with a coat of carbonate of lime as white as that of the miller's boy who lives near by. These specimens were taken out of the alluvial evidently overlying the back of the lode, with every indication of their having been subject to the influence of some great electric current. Similar indications are visible in the Van Mine ores, where they have met and seen unmistakeable evidence of some great chaotic disturbance at some remote period of the age of the world, and it struck me very forcibly that looking at the many important and extensive trials made at East Van, Glanguden, or lower Van, and further again to the south-east at Cyll Mine, where the country south of the line of Van lode has been well and fairly tried, that strange to say nothing has ever been met with in either of the mines named which would bear any comparison with or resemblence to the Van lode proper, which at the Van is hard and masterly, while at the other trials made to the east nothing has ever been discovered which would identify itself with the north or productive part of the lode as developed at the Van Mine, which has peculiar features of its own; but the specimens which were shown me are similar in every respect and characteristics as the Van lode, and have been subject to the same influence, and my impression is that having in view the extensive trials made on the line and south of Van at the places mentioned with no good results, and the fact of the country north of and adjacent to the Van being almost untried, and the further fact of this discovery so recently made being so similar in character (and lying in that direction) to the Van lead and lode, I naturally conclude that great results may be looked for here, and the prestige of this great mineral basin be kept up, and I wish the parties interested all the luck they deserve for their pluck in prospecting for a metal which is now at a very low ebb indeed.—*Sept.* 24. TREFEGLWYS.

PENSTRUTHAL CONSOLS MINE.

SIR,—I should feel much obliged if any of your readers would give me information as to what the liquidators of the above mine are doing. I suppose, from the reports and letters which have appeared in the *Mining Journal*, the concern is in liquidation, although I, as a shareholder, have had no account of the meeting sent me where such liquidation was agreed to. I do not know if this is usual, but it appears to me to be unbusiness-like. Surely shareholders have a right to be informed as to how their property is being disposed of.

A SHAREHOLDER.

WHEAL CREBOR AND THE NEIGHBOURHOOD.

SIR,—The discovery of the fine course of ore in this mine at a depth of 120 fms. will in all probability be the means of calling attention to many setts of mineral ground in the immediate locality, which are well worthy the attention of capitalists. Judging from the course of the Crebor lodes there can be no doubt that eastward they run directly through a tract of ground some years since developed to a limited extent only on the other side of the River Tavy, and then called East Crowndale. This mine proved productive of both copper and tin ores at a comparatively shallow depth, and it is the opinion of the practical miners of the neighbourhood that it is well deserving of a more effective development. The workings here certainly did not reach anything like a sufficient depth to give the lodes a fair trial. Adjoining Crebor to the south is Devon and Courtenay, where within the past two years a valuable discovery of ore has been made, and good samplings raised almost close to surface, and being in the same channel of ground there can be no reason why, as in Wheal Crebor, further discoveries should not be made as the workings are deepened on this productive lode. In a westerly direction there is an extensive tract of mineral ground reaching to the River Tamar, and comprising the old Wheal Russell, which yielded large returns of copper ores; but the engine-shaft was only sunk about 90 fms., where it reached the granite, and curiously enough, although old Gunnislake mine made all its riches in granite, when this shaft interscted it sinking was discontinued, and the workings have since been confined to another portion of the property, from which, however, good returns have been made from levels very near to the surface. Driving is being continued eastward into high ground, and can scarcely fail to lead to further importont discoveries.

Adjoining Wheal Russell is another extensive grant called South Bedford Consols, the easternmost boundary of which adjoins Wheal Crebor, and the main lode of which passes for a great length through this sett. Within its limits the old Luscombe Mine is situate, which in the prosperous days of Crebor and Crowndale was celebrated for its large samplings of copper ores. The mine was only sunk about 60 fms from the surface. South Bedford is also traversed by the old Gunnislake lodes, and by others which here are practically untried. The geological position is all that can be desired, both of the mines (Wheal Russell and South Bedford) being close upon the junction of killas and granite. They also have the important advantage of waterpower to an unlimited extent, and are situate in the immediate vicinity of Devon Great Consols, Bedford United, Old Gunnislake, and Gunnislake (Clitters).

For the sake of the neighbourhood of Tavistock and Gunnislake it is to be hoped that these mines will again soon be all in active operation, and have such a trial as will lead to discoveries worthy of being classed with those of the surrounding district. INDICATOR.

Sept. 23.

CORNISH MINING—THE GWENNAP DISTRICT: ITS PAST HISTORY.

SIR,—It would be presumption on my part to attempt to enter into the earliest history of this great mineral district, but that its riches trace back many centuries is evident from the fact that all the valleys appear to have been streamed for tin, which circumstance, with the immense surface open workings that abound, and also the numerous shafts sunk at a remote age, are strong circumstantial and collateral proof that the aboriginal inhabitants participated largely in the earliest tin trade, and its subsequent improvement by the Romans and Jews. History gives Bissoe as the port of Gwnnap, from whence tin in large quantities was shipped; the tide flowed considerably further up than its bridge. There is now no tide within two miles of it, and a goose can scarcely get under the arches where large barges once passed. Our copper lodes were in the earliest ages of mining worked from the surface for tin, hence the origin of "coffens" or "koffens" (open workings). The art of sinking shafts and driving adits was introduced by the Romans, who assisted and encouraged the natives to work their mines. In thus working for tin the tinners frequently met with copper ores, and not knowing their value, and perceiving their tin courses destroyed thereby, indignantly rejected them with the epithet "old cobre" (the Cornish for copper). The "cobre" mines derive their name from this source. It must be observed that the copper ore was at that time thrown away as mundic, hence copper mining is of comparatively recent date. It would be almost impossible within the limits of a letter to give the history of all the mines that have proved productive in the district; indeed, the whole parish may be truly designated a gigantic mineral hotbed. The Consols or Consolidated Mines in the year 1845 were very rich, and in some places as deep as 320 fathoms; about 2000 persons were employed, and the cost of working averaged 5000*l.* per month. The setts of Wheal Virgin, West Wheal Virgin, Wheal Fortune, and Cusvey comprised these mines, and when worked separately were very rich. Wheal Virgin alone in 1757 in five weeks and two days produced copper ores which sold for 15,300*l.*, while the expense of raising it was only about 200*l.* In 1819 these mines were consolidated under the management of Mr. John Taylor, and during 21 years raised upwards of 300,000 tons of copper ores, yielding 2,000,000*l.*, and leaving a gain to the adventurers of 300,000*l.* The United Mines adjoin the Consolidated, and originally consisted of four setts—Wheal Squire, Poldory, Wheal Cupbord, and Ale and Cakes; when first worked for copper were very prosperous, and were then called the Metal Works. The proprietors divided 300,000*l.*; afterwards they fell into decay, and discontinued, were again resuscitated with spirit, and produced large quantities of copper ore yielding considerable profits.

Tresavean, like others of our mines, was worked originally for tin, and copper was discovered very near the surface. It was in 1745 a company was first formed for working for copper, the principal adventurer being Mr. Williams, then of Burncoose, in Gwennap, the founder of the Scorrier House family of that name. It is said his share of profit amounted the short time it worked to 14,000*l.* It became poor, and was abandoned. It was, however, resuscitated by Mr. John Williams, of Scorrier House, grandson of the former discoverer, and worked to great advantage; again abandoned and sold with its inadequate machinery for a small sum. An outlay of about 1000*l.* succeeded in discovering rich courses of copper ore. The whole profit from this mine has exceeded 800,000*l.* There are large tracts of unexplored ground around this mine now requiring the skill of the miner only to open up wealth equal in value to the richest mines of the parish, affording a great field for the enterprising public.

Wheal Damsel, situate at the foot of Carn Morth granite hill, at its eastern extremity, has afforded striking instances of the uncertainty of human judgment in general respecting mining ground, as also of the penetrating views of individuals in particular cases, and of the success of perseverance. The lode was discovered about the year 1795, and the adit level extended many fathoms on its course. Some ore was raised, and the question agitated whether the appearances of the lode in different places and on the whole warranted the erection

of a steam-engine to sink below the adit. Some of the shareholders gave up their shares, while others increased their own by accepting those which were given up, and prosecuted the workings, but the increased expense, and the 10 and 20 fm. levels beneath the adit being at first unproductive, the adventurers, it is said, had resolved on suspending operations at the end of the month in the event of no amendment in the appearance of the lode intervening, which happily took place. In sinking a winze under the 10 fm. level the lode suddenly became rich, and the levels beneath exposed vast quantities of mineral wealth, and soon became the richest mine in the parish, or at that time in the county. In the one year of 1806 its ores produced 509 tons of fine copper, and left a profit of 36,000*l*. The total profit of this mine exceeded 160,000*l*.

Wheal Hope lode was cut from this mine by a cross-cut driven north at a deep level, but very little trial has been made on its course. It is a large lode, and perhaps no good reason can be assigned why it may not prove a productive one. It has proved abundantly so on the east; why may it not also on the west, where it traverses a piece of unexplored ground for over a mile long?

I might extend this epistle to double its length, and then not get exhausted for instances of success having attended the skill, energy, and perseverance of the Cornish miner. By your permission, Mr. Editor, in my next I will resume the subject of the value of the unwrought mineral ground of this great district.

St. Day, Scorrier, Cornwall, Sept. 24. CHARLES BAWDEN.

LLANARMON MINING.

SIR,—Having strongly advocated the development of the highly mineralised lodes of this district it affords me great pleasure to record important discoveries of lead ore at the Plass-ddu and the Westminster Bog Issa Mines, in a similar stratum, with bearing and underlie to that in which the Minera Mines to the south-east have raised ore to the value of 1,574,800*l*., and there is every indication they will be as valuable. Investors would find it to their advantage to visit this district, there being ample scope for the employment of almost any amount of capital, and in such a way as to secure large profits.

Greenfield House Wrexham, Sept. 25. JOHN L. M. FRASER,
Consulting Mining Engineer.

Meetings of Public Companies.

WEST PATELEY BRIDGE LEAD MINES.

The fourth ordinary general meeting of shareholders was held at the offices of the company, Gresham House, on Tuesday,

Mr. BAXTER in the chair.

The notice calling the meeting was read by Mr. J. Jameson Truran, the secretary.

The report of the directors was taken as read.

The CHAIRMAN said that when he last had the pleasure of meeting the shareholders he ventured to express a hope that the statement of accounts which would be laid before the shareholders to-day would be of a more satisfactory natnre than they had proved to be. In that hope they had been disappointed, but the causes of that disappointment were easily explainable, and certainly with the present prospects of the mine the disappointment was not more than skin-deep. The accounts were so clear and simple that they required no explanation, but if there were any points on which the shareholders required information the directors would be happy to give it. But he thought it would be more satisfactory to the shareholders, and more advantageous generally, just to briefly explain the causes of the disappointment, and also the present position and future prospects of the mine. With regard to the produce of last year being below what was anticipated at the time of the last meeting, he thought that he could easily explain it in a very few words. At that time they had some good prospects in the No. 2 shaft, which, as the shareholders were aware, had been sunk to a comparatively shallow depth, and ore had been cut there at an unusually shallow depth, and he believed miners would tell them that it was no uncommon thing, but rather the reverse, that where ore was discovered at this shallow depth there was no reliance to be placed upon its going down until they got into what was called settled ground. These lodes had not realised what had been anticipated, but as the directors had decided (as was previously explained to the shareholders) upon the policy of sinking down the Craven Cross shaft, and thence cross-cutting and intersecting all the lodes in the sett, they thought it would be injudicious and a waste of time and capital to sink No. 2 lower, where in all probability the lode would have been found productive, but they considered it better to drive a cross-cut to intersect the lodes. No. 2 shaft was by no means abandoned, but was being worked now on tribute. The tributers were making fair wages, and the company was making small profits; and, in addition, the mine was being explored, and discoveries were being made which might prove of value. Then, again, the shareholders were aware that the Craven Cross shaft had never been worked within the memory of any of the inhabitants there. All that the directors had heard was from tradition. But the directors had been disappointed; they had had to sink the shaft to the 68, and some portion of the distance was through very difficult, hard, and dangerous ground. These facts alone were sufficient to account for the operations last year not realising the expectations expressed at the last meeting. He should tell the shareholders that the explorations which Captain Williams had made had laid open the fact that the old workers had worked the mine much more extensively than the directors had any idea they had done; therefore, it was incumbent upon Captain Williams before he could do any permanent good to sink down clear of all the old workings. That had now been done, and Captain Williams would be able to show by means of the map that the old workers had worked extensively down to about 50 fathoms; and when he got to 56 fathoms, where he brought up the adit level from the old whim-shaft, he drove his level beyond the shaft, where he discovered the lode on which they were now working. He drove on the lode, and first discovered a fine rib of lead ore, which none but the eye of a practised miner would have detected, but it was quite sufficient evidence to the manager that they had got on the vein, and on the ore bearing portion of it. He followed it up, and it opened out into the lode which they had got now, and which, as far as he could see, and as far as he knew, was unequalled in value and productiveness since the great discovery in the Van some years ago. (Hear, hear.) Indeed, it was a wonderful lode, which surprised everyone who saw it. He might mention that very recently one of the Van directors who was in the neighbourhood visited the mine, and saw such a large pile of orestuff in the ore-house that he was astonished at its purity, and afterwards stated, in a letter written to a friend in London, that he had never seen anything so good, and said—"When I saw it I was anxious to go underground and see where such wonderful stuff had come from." Well, he went underground with Capt. Williams, and said he had never seen such a lode, even in Van. He (the Chairman) himself was down about a fortnight or three weeks ago, and was accompanied by an able and experienced lead miner who had devoted the whole of his life to mining, and was supposed to possess very great knowledge, and he said that he had never seen such a lode, but he qualified it by saying that he had once seen such a lode in a German mine, but with that exception he had never seen such a lode. This lode had been driven about 25 fms., and throughout the whole of the distance it had practically held its productiveness. On two or three occasions it had been subjected to "nips," which were certain to occur in limestone formations, but all the old miners would state that these "nips" were looked upon as favourable indications, because wherever the lode held out again, it showed that it had been strong enough to master the nip, and opened much better. In the St. John del Rey Mine it was no unusual thing for the lode to nip up to a few inches, and then in a few fathoms driving to open out again to 30 or 40 ft. He mentioned that in order to show them that when they discovered in any of the reports that the lode was in a nip there was really nothing in that to be alarmed at. They had passed through two or three nips already, and when Capt. Williams wrote on Thursday the lode in the 56 was in a nip, but had opened out since, with every prospect of its further improving. Beyond the end, in the 56, there were about 60 fathoms up to a gulf, or cross-vein, and there was every reason to believe that this lode would hold up to that point, and probably it might there be disturbed; but if it held up to that point he thought there was not much doubt of its being found beyond it, although by some convulsion it might be thrown in a different course. If it did that there was no other mine in this kingdom which would have so valuable a course of lead, nor anything to be compared to it. In the 67 Capt. Williams was driving now on the lode, and he stated he had there a fine lode, which was looking finer, better, and stronger, and in every way more promising than in the 56, He had not yet reached the ore-bearing portion as the lode had dipped, and he would have to drive a considerably greater distance in the 67 than in the 56 before he got to the same body of ore, assuming that it went down there. Immediately he got to the ore-bearing portion of the 67 fm. level, assuming it held out anything like the same value, and all experience proved it was likely to improve in depth, he would at once be enabled to at least doubled his returns without stoping. Capt. Williams had driven about 25 fms. in the 56, and for that distance ore had been left in the backs ready for stoping when desired. In his report Capt. Williams stated:—"At a point 9 fms. east of shaft we have two cross-cuts driven at right angles from Craven Cross vein, which will intersect in succession the whole of the veins in the sett, those on the north being entirely in whole ground and proved rich in the adjoining property, more especially the Cleaver, Lumb, and Rake veins—those on the south being Stye Shaft, Longthorn's, and other veins. From a small shaft upon Longthorn's vein a few miners have raised 12,000*l*. worth of ore in a very short time. The south cross-cut, worked by Cranston's rock drill, has been extended 33 fms, and the end is within a very short distance of reaching Stye Shaft vein." Whenever he got that it would give him two more levels to drive, and of course it depended upon the productiveness of the lode as to what the returns would be. The cross-cut from the other side, where Capt. Williams was going to cut the Cleaver, Lumb, and Rake veins which in the adjoining property had been rich, and ran into this company's sett, and if there was a combination or "pan" of lodes, as Capt, Williams called them, the geological formation was such—namely, limestone capped with shale, as justified the hope of great discoveries there. Of course to some extent this was problematical, because in all mining no miner could see beyond the end of his pick, but he could say this—that so far as he was able to judge, and as far as authorities far more able to speak on such a subject had expressed an opinion, he believed the prospects of the mine were exceptionally good, and he believed there was no other company and no other enterprise which was so favourably circumstanced, or with such promise of large returns at an early date. He hoped they might have a better price for lead, and he thought that there was every prospect of such being the case. Certainly it was a very ruinous thing to work a sett with lead at the present price. He noticed in the report of the Tankerville Company it was stated that in 1873 the lead realised 17*l*. 3s. 3d per ton, and in 1879 it only realised 7*l*. per ton, or a difference of about 10*l*. per ton.

Captain WILLIAMS: We used to sell lead at 22*l*. 15s. per ton, and our last sale was at 13*l*. 12s. 6d.

The CHAIRMAN said there was no doubt the market had been influenced by American competition, but the idea was gaining ground that instead of America stocking our market she would soon come to the English market, as her large lead-producing districts were not realising the expectations formed of them, and at present the produce was not equal to the requirements, owing to the increased building which was going on, and to the improvement in trade generally. Therefore, there was every probability that China, Japan, and Russia, to which during the period of dull trade America had sent large quantities of lead (and which were formerly the best markets for English lead), would again come to the English market. In fact, he was told that at the present time Russia was a very large purchaser in the English market. He could only say that he should be exceedingly pleased to see an improvement in the price of lead, it would be acceptable just at a time that this company was in a position to make regular and, he hoped, much better returns. (Cheers.) The result of Capt. Williams' operations with the Cranston rock-drill had been encouraging, for he found that at the same cost he could do about 150 per cent. more work than by hand labour; therefore, the directors had thought it a prudent thing to order another, so as to drive both the cross-cuts, which were in exceedingly hard ground, by means of the drill; and as soon as that second drill was got in proper working order the probability was that the directors would order a third, so as to have one in the shop for repairs, that whenever any little accident occurred the work would not be stopped, but another drill would take the place of the one temporarily disabled. (Cheers.) He moved that the accounts of the company to June 30, having been examined and audited, be passed.

Colonel J. A. TODD seconded the resolution.

A SHAREHOLDER asked how it was that the meeting had not been called earlier, seeing that the accounts were made up to June 30 last?—The CHAIRMAN said that under any circumstances the accounts could only have been brought down a month later. As to the slight delay in calling the meeting, he was responsible for that. In the judgment of the directors the operations which were being carried on were so important, and the points which they were approaching were so considerable for the future of the company, that the directors thought any little delay in submitting the accounts would be more than compensated by the information which they would be able to give, and he thought the result had justified that view. (Cheers.)

The resolution was then put and carried.

Mr. G. M. HARVEY moved the re-election as directors of Mr. Baxter and Colonel Todd. He thought they could not have a more efficient Chairman, nor a gentleman more able to give the shareholders a lucid explanation of the operations and progress at the mine. (Hear, hear.)

Mr. PEARSON seconded the resolution, which was put and carried.

The CHAIRMAN acknowledged the compliment. He said he took a deep interest in the company, and occasionally visited the mine, and as he was a considerable holder of shares the shareholders might rely upon his doing all in his power to make the mine a great success.

Mr. FRED. MANSELL suggested it would be interesting to many shareholders if Captain Williams would give a few additional particulars.

Captain DAVID WILLIAMS, by the aid of a map, explained the positions of the workings. He said that since the new lode had been intersected in the 56 fathom level it had opened up to 3 feet wide. Last month they drove the level 4 fathoms. They had taken out last month, with four men, 25 tons of lead, which left a profit of 210*l*., after paying all expenses. The quality of the ore was so good that it required very little dressing. It was separated into two qualities, the first quality being almost solid lead. There was another very important point. They were driving a cross-cut to the old main lode, where the old workers got their riches, and he thought that something good would be got there. The 67 was a very important point. It had been driven about 21 fms., and there were 5 fms. more to drive to reach the commencement. The lode was about 2 ft. wide, and very promising, much more so than in the 56, before they got the ore, and he had no doubt they would get it as rich in the 67 as in the 56, and when they did that they could double the returns.

A SHAREHOLDER asked what distance that was from the boundary?—Captain WILLIAMS said about ½ mile. Another important point was that further west of the end, clear of the old men's workings, where there was a considerable thickness of shale and peat, which could not be sunk through without considerable pumping machinery, which was the reason why the old workers could not work it.

Mr. A. PARRICK: Into what property does the lode run?—Mr. WILLIAMS said it ran into the East Grassington, where they were sinking on a parallel lode. During the last three months they had raised on an average (in the West Pateley Bridge) 25 tons of ore per month out of this part of the lode, independent of stoping. At the bottom of the level it was 3 ft. 6 in, wide, which was richer than any of the levels.

Mr. ALFRED PARRICK asked what had been the extreme width of the level in the 56?—Capt. WILLIAMS said it had been 42 inches at the bottom of the level. It had been richer all along under the bottom of the level than in the roof of the level. The next important point was that they were cross-cutting 9 fms. east of the shaft or parallel vein. He had no doubt in his own mind that the Lumb, the Cleaver, and the Rake lodes (the latter of which was valued at 10 tons to the fathom in the adjoining property.) ran through the property. On the south side they had the Stye shaft vein, which was extremely rich in the adjoining property in the south. He was within a few fathoms of reaching that lode, which had not been worked upon in this company's property. Then there was Longthorn's vein, which was worked by two miners, who out of one haul got 12,000*l*. worth of lead. The company had that lode for upwards of half a mile. Then there were other lodes which had been more or less worked. There were workings in the western portion of the sett. They were working below the 28 fathom level at 5*l*. per ton of dressed ore, which left 4*l*. per ton profit. He put cross-cuts out to the south, and had intersected a lode, and last month they made a little profit out of it, but they had not yet got under the perpendicular shaft, where they left a good bunch of ore; in the bottom of the shaft they had water. The lode was improving in size, and had some good ore, but as the cross-cut from the 56 would come under it they were waiting till the cross-cut came up. He had always had a great opinion of this sett. He had taken shares, believing they had a very splendid mine. If they got the ore in the 67 equal to the 56 he would be able to give the shareholders dividends next year.

Mr. A. PARRICK asked Capt. Williams whether he understood him to say that at the sole of the 56 the lode was 3 ft. 6 in., of solid lead?—Captain WILLIAMS: Yes; at the bottom of the sump.

Mr. A. PARRICK: Have you ever known any other lode of that richness?—Capt. WILLIAMS: No; we have one of the best discoveries which has been made during 20 years, but the question is how far we have it, and how deep it will go.

Mr. A. PARRICK: Have you formed any opinion about the prospect of the 67?—Capt. WILLIAMS: Judging from what I have seen in the 56, my opinion is we shall get it in the 67. There is a splendid lode there.

Capt. WILLIAMS, in answer to a SHAREHOLDER, said there were between 70 and 80 employed at the mine altogether.

The CHAIRMAN said that a large number of points were being driven, so as thoroughly to explore the mine.

Mr. F. MANSELL said he had inspected a very large number of lead mines in this country, and also abroad, and he had never seen such a mine as this. The Government mineral agent for Harrogate had visited the mine, and expressed himself astonished, and said he had no idea there was such a rich lode in the neighbourhood.

Capt. WILLIAMS, in answer to Mr. MANSELL, said they had no water to trouble them. The 56 took the surface water, and there was very little water in the other ends.

The CHAIRMAN mentioned that in the 56 they had got to the extreme end of the old workings and into virgin ground up to the surface, so that as they went in there would be valuable reserves.

A SHAREHOLDER said he believed they smelted their own ores?—Captain WILLIAMS said that was so, and it effected a saving of about 1*l*. per ton. The lead was of the very best quality. The last parcel of ore realised 13*l*. 12s. 6d. net, without any deduction for hard lead or any commission, which was an advance of 1*l*. upon the previous sale.

The CHAIRMAN said he might mention as an important point that the company had no surface damage to pay for.

Capt. WILLIAMS, in answer to Mr. Harvey, said that at the present price of lead about 25 tons of picked lead per month would pay expenses. The expenses, even with the increased output, would remain very much what they were now.

On the motion of Mr. BUTLER, seconded by Mr. PEARSON, Mr. Carter was re-elected auditor.

On the motion of Mr. MANSELL, seconded by Mr. HARVEY, a cordial vote of thanks was passed to the Chairman and directors, and also to Capt. Williams, and the meeting broke up.

WHEAL GRENVILLE MINING COMPANY.

A general meeting of shareholders was held at the offices of the company, Union-court, Old Broad-street, on Thursday (Mr. R. W. GOOLD in the chair), to pass the accounts for sixteen weeks made up to Sept. 13, and to transact the ordinary general business of the company.

The CHAIRMAN said he thought there were two or three causes for satisfaction. The first, and not the least, was that he should have to trouble them with but few observations. The second was that the price of tin was rising a little, and although he did not think that this company was getting a fair price for its tin, looking at the price of refined tin, yet in these days they must be thankful for small mercies, and it was something to be thankful for that since the last meeting there had been a substantial rise for tin. The probability was that they might get a still more substantial rise before the time of the next meeting. He was not, as he had said, satisfied with the price the company was obtaining, because when refined tin was selling at 57*l*. per ton this company was getting 34*l*. and 35*l*. per ton, and now that tin had gone up to 75*l*. per ton the company were only getting 42*l*., and he thought that could not be considered a very satisfactory proportion. There was another very satisfactory feature with respect to these figures, which was that during the past two months the produce from the mine had been 25 tons per month, which was satisfactory, although he had hoped and believed that they would have reached 30 tons per month before now. The third cause for satisfaction was to be found in the following pithy sentence in Captain Hodge's report:—"The mine is opening out well in going east. We have sold during the last two months about 50 tons of tin, and we hope to sell 75 tons during the next twelve weeks; at which time, if the lode opens out in the 165 as we are led to expect now, we shall be in a position to sell 30 tons a month, which with only a moderate price for tin would leave a fair profit." He believed that before next meeting they would arrive at that stage, because Capt. Hodge was a most cautious man, and would not have made that statement unless he believed it would be carried out. Now, 30 tons per month, even at the present price of tin, would he would not say leave a fair profit, but would put the company in an exceedingly satisfactory position; but if the price should go up to 50*l*. per ton then Wheal Grenville would be taken out of the non-dividend paying list of mines. His own impression was that they would see that before next meeting, and if that were the case, with a produce of 30 tons per month, in 1880 the directors, instead of making calls, would be able to return some of the outlay which the shareholders had so cheerfully borne. If they were to get 50*l*. per ton they would then be able to go back and work at a profit thousands of fathoms of ground which had hitherto been left unworked owing to the low price of tin. During the past six months much had not been done in sinking the shaft, but now that Capt. Hodge had got pretty nearly all his other heavy work done sinking of the shaft would be resumed within the next month. He hoped by March next they would get down to another level. He referred to the fact that the 150 end was being driven by boring machinery, and the 165 end by a set of men; and he mentioned the fact that, as by the terms of their contract, those men got through the maximum amount of work, they had done an amount of work almost equal to that done by the boring machinery. All the ends were going east, and for the most part the western ground had been, he would not say abandoned, but since the last meeting they had not been doing much in that direction. Therefrom the directors deduced the strongest argument in favour of the course they adopted two years ago with regard to the position of the shaft. It had been said, both in public and in private, that the directors were wrong in putting down the shaft so far eastward, and that they ought to have gone more to the west. But the committee, as had been proved by subsequent events had been perfectly right in the course they took, because they found that the further they went eastward the stronger was the evidence that not only were they right, but as a matter of fact if they had the option over again they would put the shaft 50 or even 100 fathoms further east than they had done. He believed they were going in the right direction, and into ground that would turn out better than any ground which had hitherto been opened up in the mine. The 150 had been driven from 25 to 30 fathoms all upon ground going down diagonally. They expected before now to find that ground in the 165, but upon an examination of the plans he was not disappointed that they had not found it. All the runs of ore dipped so much to the eastward that a little dip would take them a good distance from the perpendicular line, and he believed they had still 2 or 3 fathoms to drive before they got to that ground. As regarded the 150, that had been driven rapidly, and his opinion was that there they were on the eve of getting into another piece of good ground. If those two ends opened up as well as there was every reason to expect they would then Wheal Grenville was secured, and he hoped that before they met again discoveries would be made in the 165 and 150, which would tell permanently upon the returns of tin. The first instalment of the lords' dues had been paid, but he expressed his regret that the lords had not made a greater concession, as he could not look upon the permission to pay the dues in six instalments as any concession at all. He moved that the accounts and agents' report be received and passed.—Mr. CLIFT seconded the resolution, which was put and carried.

On the motion of the CHAIRMAN, seconded by Mr. BELLINGHAM, a resolution was passed authorising the committee to pay the second instalment of one-sixth of the amount claimed for lords' dues and damage to land to May 31—274*l*. 12s 2d.

The usual complimentary votes closed the proceedings.

SOUTH CROFTY MINING COMPANY.

A special meeting of adventurers was held at the mine on Sept. 19 (Mr. H. J. LEAN, the purser, presiding), at which there was a good attendance of shareholders.

The CHAIRMAN stated that a subject which created a great deal of discussion at the last meeting was the amount of arrears then due, amounting to 1100*l*., and a resultion was passed that the purser should obtain the calls, and take steps for procuring the amounts due from persons who were more than one call in arrear. He had written to the parties—some of them rather strongly—and the call had been responded to in a wonderful manner. In fact, he never found the calls come in so fast before. There was now due on the regular share account 43*l*., on relinquished shares 216*l*., and calls on shares declared forfeited 55*l*., making a total of 315*l*.—Mr. BAILEY (London) moved "That another 14 days be given to those shareholders who had not paid their calls, after which, if not paid, the company's solicitor should enforce payment."

Mr. RODD (Penzance) seconded the motion, which was carried unanimously.

The CHAIRMAN mentioned that at the last meeting he was instructed to write to the East Pool Mine Committee respecting the continuation of the sum agreed upon towards the charges for pumping water from that mine, He had received a reply from Mr. Martyn, the purser, that the members of the Mine Committee refused to render any further assistance to South Crofty for the pumping of the water, as they considered the discovery already made through the help of East Pool in South Crofty should render the latter independent of assistance.

Capt. ABRAHAM JAMES, and one or two other shareholders, thought this was rather severe, and suggested that further efforts should be made to pursuade the East Pool Committee to contribute as before.

Captain JOSIAH THOMAS promised to see them on the subject, and the matter then dropped —The agents reported as follows:—

The 205 is now driven on the new lode 6 fms. east of cross-cut. In the circular convening this meeting we reported the lode for 4 fms. in length to be worth 30*l*. per fathom. For the last 6 ft. driving the lode was not so productive, but it has again improved, and is worth in the present end 25*l*. per fathom. We have only yet driven 3 ft. west of the cross-cut, but being so near to the cross-course, the lode is not fully settled. It contains good stones of tin, however, and is similar in appearance to the lode in the eastern end, when that end was the same distance from the cross-course. There is a cross-cut at the 180, just over the 205 cross-cut, which is only 30 fms. short of the new lode. This cross-cut we think should be driven at once, and with all convenient speed. There is another cross-cut at the 160, 35 fms. further west, which would probably intersect the new lode by being driven from 12 to 15 fms. further. This new lode, it should be observed, passes through the entire length of our sett, and, as will be seen by reference to the position of the above cross-cuts, can be easily explored. Adjoining as it does the rich mine of East Pool, and being in the same geological position, we see no reason why South Crofty, on being developed, may not prove to be a valuable and lasting mine.

Mr. RODD thought it must be apparent that had it not been for the use of the boring machine South Crofty would have been stopped some time since; the patience of the adventurers would have been exhausted, and the present lode would not have been discovered. He suggested that the best course to pursue would be to prosecute the driving of the levels as mentioned in the report, with boring machines, and moved the adoption of the agents' report.

Mr. BAILEY remarked that as the mine had proved itself so much more valuable than expected, he thought it should be carried on energetically. In order to properly develope the mine they would require a new boring machine, and the 160 cross-cut might be prosecuted by manual labour.

Capt. THOMAS said to carry out the 160 cross-cut by manual labour would cost, if six men were employed, about 30*l*. a month extra.

Mr. BAILEY thought it would not be desirable to let that cross-cut stand idle for four months, which it would take to carry on the cross-cut to the 150, as they would be losing all that time by the delay.

Capt. THOMAS observed that to prosecute the 180 and 205 by means of a boring machine, and the 160 by hand labour, as suggested by Mr. BAILEY, was the proper way to open up the mine. It was only a question of expense.

Mr. BOLDEN (Mr. Basset's agent), before alluding to the application made by the management of South Crofty for North Crofty sett, said it might be right for him publicly to state that they had not only to thank the East Pool adventurers for having contributed to the great discovery made in South Crofty—East Pool only contributed half of the 35*l*., the other half coming from Mr. Basset. (Hear, hear.) With regard to the extension of South Crofty mine to the North Crofty sett, the land was divided between several lords, and the agents would have to meet, in order that they might be agreed on the subject. He might say that when the time came Mr. Basset would not be the one to refuse them his assistance. But from what he heard they were not yet in a position in South Crofty to properly develop it. They did not propose to extend driving north, and he thought it was a little premature for them to ask for ground to drive north.

Capt. THOMAS replied that they merely wanted to make sure of being able to obtain the ground in case their lode went in the direction of the North Crofty sett. They asked for it thus early, so that if the lode run out to their boundary they might be able to follow it. They wanted to be quite sure as to how far they could follow the lode.

Mr. BOLDEN promised that the matter should be attended to, and after some minor matters had been disposed of the meeting terminated.

NEWTON SILVER MINING COMPANY.—The first general meeting of this company, which has just been held at Birmingham, passed off very satisfactorily. It will be recollected that the company was formed by some of the original investors in Wheal Newton, who suffered disastrously from circumstances entirely outside the intrinsic merits or demerits of the mine itself. Knowing that the outputs of the mine had been something almost unprecedented in richness the present owners resolved to get it into their hands, hoping by judicious and economical management to recoup themselves for previous losses. Such management is now being exercised, and the new company is entirely freed from those heavy and burdensome expenses which prove so disastrous a drag upon many otherwise profitable undertakings. The directors believe they are on the high road to success, for although they have been at work but a few months, and have had much to do of an unproductive nature, in consequence of the suspension of the mine, their reports are most encouraging, and they are confident in the belief that they are in the neighbourhood of very rich deposits of silver ore, and they are at the present time actually cutting silver from a lode which promises to prove of great value. The directorate is in the hands of those most interested in its success, and is of a perfectly bona fide nature, and it is believed that if only the facts connected with the undertaking were known to the former shareholders in Wheal Newton, and to mining investors generally, the company would at once be provided with a capital such as would enable them to make their property one of the most valuable in the kingdom. As the original object of the formation of the Newton Silver Mining Company was the benefit of former investors in Wheal Newton the shares are held by such investors only, and have not hitherto been offered at all to the outside public; it is, therefore, gratifying to find that an early and valuable improvement in the lodes is highly probable. The latest report from the mine (Sept. 22) states—"We expect to finish clearing out the 40 east to the end to-morrow. The 20 end east is without any change, but still presents a very promising appearance. The lode in the shallow adit, driving east of the rise, is full 2½ ft. wide, and is one of the prettiest lodes I have ever seen; at present it is yielding some paying work for silver, with every appearance of further improvement. We have not yet commenced to dress the ore already sent up, as the parties that understand it best have been engaged in the 40 east, but in a day or two we shall take this in hand. We expect the money for the tributers' silver ore already sold will come in, so as to assist to meet our next cost-sheet."

COAL IN BRAZIL.—According to the Gazeta of Porto Alegre the explorations in the Arroio dos Ratos coal mines have resulted in finding at a greater depth than the beds worked by the English Company great beds of very superior coal, which, it is alleged, is fully equal to imported coal.

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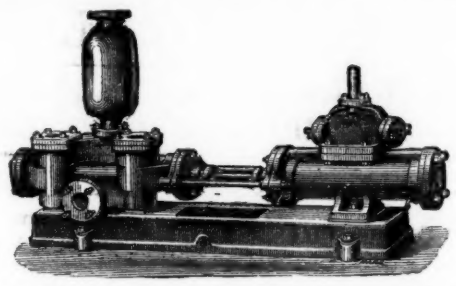

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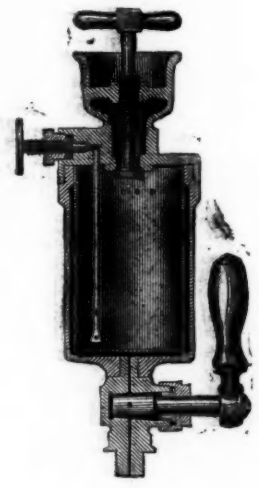

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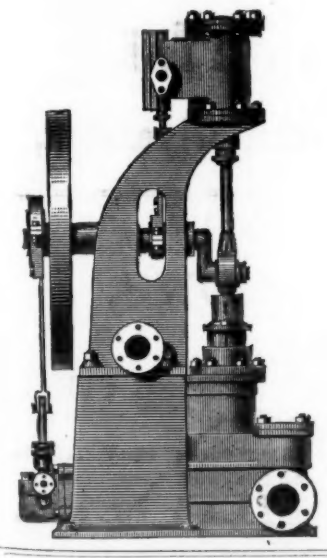

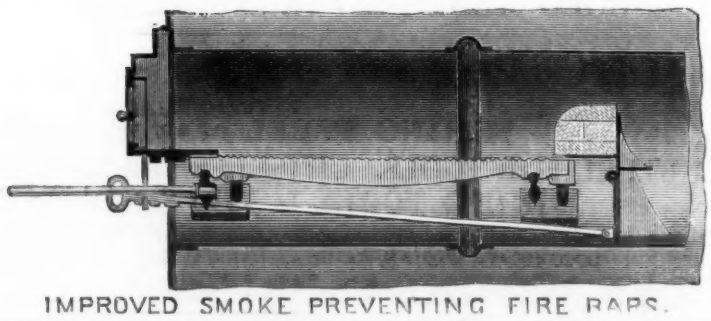

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TO SUIT ANY FLUE OR FURNACE.

PRICES ON APPLICATION.

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3	5 to 7	20 0
4	7 10	25 0
5	10 20	30 0
6	20 30	37 6
7	30 50	47 6
8	50 70	60 0
9	70 100	85 0
10	100 200	110 0

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Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

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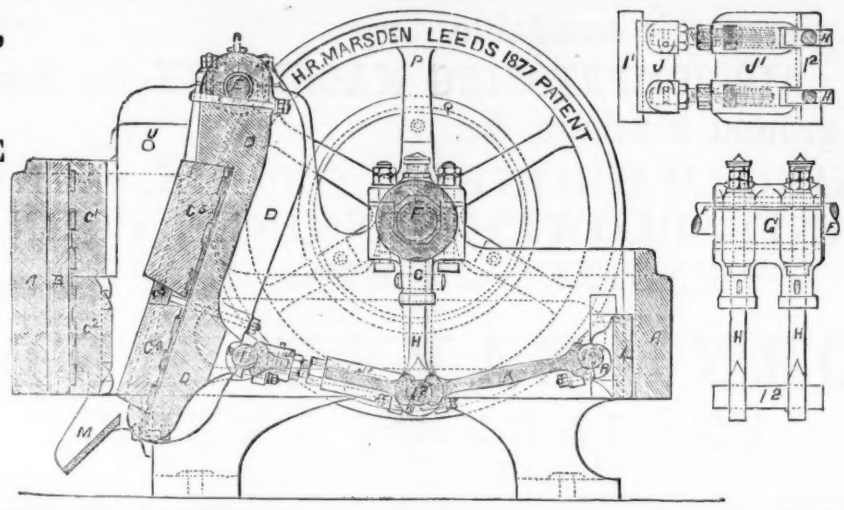
NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharthole Lime Works, Maryport, Whitehaven, November 7, 1873.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2¼ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,
FRANCIS GOULD.

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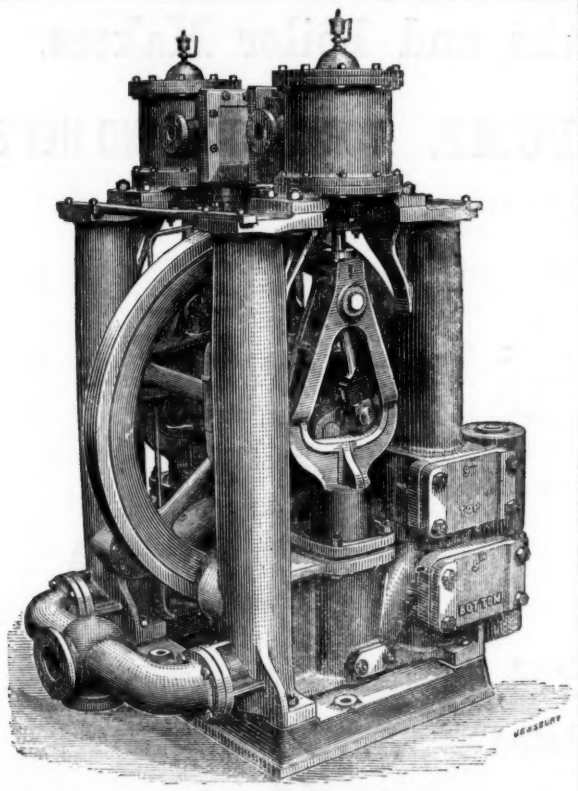
ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.



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Air-Compressing Machinery,

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Worked by their PATENT BALANCE-WEIGHT MOTION.

Canal Head Foundry and Engineering Works, Ulverston,

LANCASHIRE.

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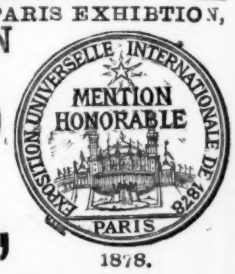

1878.

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